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Labour productivity

Labour Statistics: Concepts, Sources and Methods

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A productivity measure is an indicator of the efficiency or effectiveness of production; that is, how much production (or output) is achieved given a certain amount of resources (or input). The broadest definition of 'productivity', from the International Labour Organization (ILO) is "the ratio between output and the total input of factors required to achieve it". In this sense, productivity is "the end result of a complex social process including: science, research and development, education, technology, management, production facilities, workers and labour organisations".

Most analyses seeking to measure productivity have confined themselves to a partial (or single factor) measure, as opposed to total factor (or multi-factor) productivity. Single factor measures of productivity are expressed as a ratio between a given measure of output and a given measure of one factor of production (labour, capital, raw materials, etc.). It follows that there are many measures of productivity, each of which relates to a particular factor of production. It is therefore possible to speak of the productivity of labour, of capital, of raw materials, etc. Such measures reflect the growth in output not accounted for by the growth in that particular factor of production. The ratio of output to hours worked - often referred to as a measure of labour productivity - reflects the growth in output attributable to all factors of production other than hours worked. Often the measure used varies in accordance with the level at which productivity is analysed, e.g. plant, industry, branch of the economy or the economy as a whole.

Increases in labour productivity are often regarded as an indicator of improvements in aggregate living standards, as either more output (and thus total income) is achieved with given labour, or a given amount of output (and thus total income) is achieved with less time spent on labour.

Concepts and international guidelines

While the ILO has published two studies (in 1951 and 1969) on the measurement of labour productivity, no fixed definitions have been promulgated by that organisation. The view taken in the 1969 study was that, while it was useful to have a set of definitions which correspond to the various measures of productivity, it was premature to set a single productivity ratio for each measure. At the same time it was recognised that time worked or labour force may be suitable measures of labour input, while physical output and value-based measures were appropriate for considering output for particular purposes. This flexibility remains appropriate depending on what use or analysis is to be performed with the productivity measure involved.

Considerations such as those led an ILO Working Group on Productivity Statistics to make recommendations, especially on the economic coverage of productivity series, the choice of units of measurement for output, and the corresponding labour input. For output, estimates of real gross domestic product (GDP) were preferred. For labour inputs, the objective was to ensure that account was taken of all the activities of all persons engaged in production.

The Working Group considered that the improvement of labour productivity statistics depended on better national statistics on output, and on the existence of corresponding data for employment or hours of work. Similarly, it was considered that the ability to compare the trend and level of productivity between one country and another improved with the use of comparable concepts for the definition of output, input and prices, and the wider use of international standards in existence in these fields. The standards being referred to, in particular, were those of the International Conference of Labour Statisticians in respect of input, the United Nations System of National Accounts in respect of output, and the International Standard Industrial Classification in respect of scope and classification.

More recently, the ILO have included labour productivity information as part of the suite of statistics known as Key Indicators of the Labour Market (KILM). This recognises labour productivity as "output per unit of labour input (persons engaged or hours worked)". Output is defined as GDP for the economy adjusted to account for price differences in countries, while the appropriate measure of labour input is identified as the total number of annual hours actually worked by all persons employed.

Definitions, methodology and sources

The ABS recognises that the level of GDP and changes in real GDP are a function of many different factors including capital, labour, technical knowledge, scale of production and managerial efficiency. Changes in any one of these factors can result in productivity changes. While it is impossible to objectively measure the role of these factors separately, it

is recognised that one of the most important and widely accepted analytical series, which is a measure of labour productivity, is real GDP per hour worked.

Estimates of labour productivity (based on GDP per hour worked), for the market sector as a whole and for each industry, are compiled by the ABS and published in the annual Australian System of National Accounts. Quarterly indexes of GDP per hour worked are published for the market sector and for the whole economy in Australian National Accounts: National Income, Expenditure and Product (/statistics/economy/national-accounts/australian-national-accounts-national-income-expenditure-and-product/latest-release) .

As partial measures of productivity, labour productivity indexes implicitly reflect the other factors of production, such as the contribution of capital and other factors affecting production such as technological change. When multiple factors of production such as labour and capital are explicitly considered as inputs, this is termed multi-factor productivity (MFP), which is measured as GDP per combined unit of labour and capital. MFP is often also used in productivity analysis, and for this reason the ABS also publishes annual indexes of MFP for the market sector in Australian System of National Accounts. In addition, the ABS produces annual MFP estimates at the industry level for industries within the market sector, which are available from Estimates of Industry Multifactor Productivity. The choice of which productivity measure to use depends on what analysis is being performed. For more information, see Australian System of National Accounts: Concepts, Sources and Methods (/statistics/detailed-methodology-information/concepts-sources-methods/australian-system-national-accounts-concepts-sources-and-methods/2020-21/chapter-19-productivity-measures) .

Labour input

The most common measure of labour input used in compiling the estimates presented in Australian System of National Accounts and Australian National Accounts: National Income, Expenditure and Product is hours worked. It captures the hours worked in the production of goods and services by civilian wage and salary earners, employers, self-employed persons, unpaid family workers, and members of the Australian Defence Force.

Measuring labour input as hours worked implicitly assumes that the workforce is homogeneous. An alternative approach is to use quality adjusted labour inputs (QALI). The QALI method recognises improvements to human capital due to the varying educational achievements and experience within the workforce. QALI indexes are published for the market sector in the Australian System of National Accounts, for each market-sector industry and the twelve selected industries aggregates in Estimates of Industry Multifactor Productivity.

The quality changes in labour input are captured through accounting for heterogeneity across different types of workers, by aggregating different types of workers with weights (based on wage share) reflecting differences in their productive capacity. In this way, increases in labour input can be divided between total hours worked and compositional changes in the labour force. As the workforce evolves, this compositional change can directly affect how much output can be produced from a given quantity of hours worked.

The estimates of employment and hours worked are drawn from the Australian Labour Account. Aggregate and industry QALI indexes are compiled using data from the Census of Population and Housing. Intercensal periods are interpolated, and therefore care should be taken interpreting year on year changes in labour composition. For further details refer to Chapter 19 of Australian National Accounts: Concepts, Sources and Methods.

Chain volume estimates for Gross Domestic Product

The estimates of real GDP used in the derivation of the ABS labour productivity statistics are annually reweighted chain Laspeyres volume measures. The concepts and definitions used in deriving chain volume estimates are explained in Chapter 6 of Australian National Accounts: Concepts, Sources and Methods (/statistics/detailed-methodology-information/concepts-sources-methods/australian-system-national-accounts-concepts-sources-and-methods/2020-21/chapter-6-price-and-volume-measures) .

Gross Domestic Product per hour worked

In Australian National Accounts: National Income, Expenditure and Product and Australian System of National Accounts the term 'GDP per hour worked' (and similar terminology for the industry statistics) is generally used in preference to 'labour productivity' because:

- the term is more self-explanatory; and
- the measure does not attribute change in GDP to specific factors of production.